

# An improved method of spectrum extraction based on 2-D Gauss model for LAMOST

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**Abstract** An improved spectrum extraction method based on two-dimensional (2-D) Gauss model is presented for the Large Sky Area Multi-Object Fiber Spectroscopic Telescope (LAMOST). As the previous 2-D fiber spectrum extraction methods, the improved method still uses the flat-field images and the calibration lamp images respectively to determine the parameters of the 2-D Gauss model, at the same time the means of evaluating the parameters is modified. The proposed method makes full use of the correlation between the spectrum signals and the non-correlation between the noise. The means of extracting the original spectrum from the observed 2-D spectra is modified as well. We utilize the symmetry of the spectrum contour to weaken the influence of noise. The experiments are performed with the simulated data based on the feature of the real LAMOST data and the real data on LAMOST. The experimental results show that our improved method is more effective and accurate than the previous spectrum extraction methods used on LAMOST.

**Keywords** LAMOST · Spectrum extraction · 2-D Gauss model · Fiber spectra · Profile fitting

## 1 Introduction

The Large Sky Area Multi-Object Fiber Spectroscopic Telescope (LAMOST) is the largest diameter, largest field of view optical telescope in the world. It has a 4-meter aperture, 4000 optical fibers, 16 spectrographs, and 32 charge-coupled devices (CCDs) with 4096\*4096 pixels [1].

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